SECTION 1

INTRODUCTION

1.1 BACKGROUND

On behalf of the General Electric Company (GE), Quantitative Environmental Analysis, LLC (QEA) has prepared these comments on the U.S. Environmental Protection Agency's (USEPA) documents titled *Modeling Study of PCB Contamination in the Housatonic River, Model Framework Design* (MFD; Weston, 2000a) and *Quality Assurance Project Plan* (QAPP; Weston, 2000b). The October 2000 MFD and QAPP were developed by the USEPA modeling team under the direction of the USEPA New England Region, Boston, MA. The MFD and QAPP describe plans for the development, calibration, and validation of PCB fate, transport, and bioaccumulation models of the Housatonic River between the confluence of the East and West Branches and Woods Pond. This modeling effort is being conducted by USEPA under the provisions of a Consent Decree that was executed by GE, USEPA, and other governmental agencies in October 1999 and entered by the U.S. District Court in Massachusetts on October 27, 2000. That Consent Decree also provides for peer review by an independent Peer Review Panel at various stages of this modeling effort. At the present time, this peer review will focus on the modeling framework and data needs set forth in the MFD and the QAPP.

Some of the comments presented herein were discussed with the USEPA and its modeling contractors during regular modeling working group meetings over the last 18 months. The modeling working group consists of technical staff and contractors representing both the USEPA and GE. During these meetings, the USEPA, its contractors, GE and QEA discussed many of the technical aspects of PCB fate and bioaccumulation model development for the Housatonic River. This document presents GE's written comments on the MFD and QAPP for consideration by the Peer Review Panel.

As specified in the October 17, 2000 public notice announcing the modeling peer review, the comments have been formatted in accordance with the six specific questions in the charge to the Peer Review Panel (Sections 2 – 7). GE's major comments pertaining to the MFD and QAPP are summarized in Section 1.2 below.

1.2 SUMMARY OF MAJOR COMMENTS

The MFD and QAPP are well written, organized and presented. The USEPA modeling team should be commended for its efforts in developing these documents. Moreover, the modeling working group meetings and interactions among USEPA, its modeling contractors, GE and QEA have clearly been constructive. Many of GE's comments on the Agency's approach to the problem, as documented in previous drafts of the MFD and QAPP, have been addressed. Nonetheless, there are a number of remaining issues that we believe warrant further comment. These are summarized below and described in detail in the following sections.

- The model domain should be expanded to include the plant site and downstream portions of the River to the Massachusetts/Connecticut border. Including the plant site region will provide an opportunity for model evaluation and testing since the sediments in this reach are currently undergoing remediation. Extension of the model to the Massachusetts/Connecticut border will allow the assessment of the impacts of sediment remediation on downstream resources.

- The conceptual model developed by the USEPA should consider the entire Housatonic River data set. Judgments about the importance of individual processes, particularly those better evaluated using long-term monitoring data, should be avoided when considering the temporally limited data set collected by the USEPA. The entire 20 year data set should be evaluated as a whole when considering these processes.

- The approach for representing sediment bed load transport and the dissolution and transport of oil-phase PCBs should be developed. As recognized in the MFD, these

processes may be important to the fate of PCBs within the Housatonic River. The MFD should provide the details of how these processes will be integrated into the existing model frameworks, including the corresponding equations within both the proposed PCB fate models.

- Site-specific data should be collected to support the calibration of sediment bed load transport simulations. Additionally, data should be collected to support the models' representation of water column and sediment PCB partitioning. There are currently no data to support the sediment bed load modeling. Data collected to support the PCB partitioning are insufficient to accurately parameterize this important PCB fate process.

- In several respects, the USEPA's models are overly complex and will not have sufficient available data to support or constrain those complexities. This added complexity without supporting data will increase the uncertainty of the models' predictions without recognizing those uncertainties, and thus could lead to erroneous predictions. In these respects, it would be better to develop a simpler modeling approach that is supported by the data and then to conduct an appropriate uncertainty analysis to address the uncertainties in a more transparent way. In particular, complex ecosystem dynamics (i.e. fish biomass changes over time) should not be modeled. The data do not exist to support and constrain such a modeling effort. Moreover, the added complexity is counter to USEPA's goal of model parsimony. A more supportable approach is to bound the diet of each species based on available site data and published studies of those species in other water bodies, then calibrate the model by adjusting the diets within those bounds, and then address the resulting uncertainty through sensitivity and uncertainty analyses.

- The complex linkages between the different models may pose significant mass balance issues and contribute to the uncertainty in model projections. This is of particular concern with the linkages between the two PCB fate models to be developed. PCB fate should be calculated with a single model code.

- Monte Carlo simulations should not be used to evaluate model uncertainty. The data do not exist to specify the distributions underlying key model coefficients. Uncertainty analysis should be conducted by developing and analyzing alternative calibrations that fall within the range of the data but use alternative sets of key model coefficients.

These comments, and others, are presented in detail in the following sections of this comment document.